WHAT IS CLAIMED IS:

1. A metal-gas battery comprising at least one metal-gas cell, wherein each metal-gas cell comprises:

a soft pocket having two flexible and planar walls, wherein peripheries of the two walls are connected except along respective top edges of the two walls, the soft pocket being made of an elastic and alkaline-resistant material;

two groups of threads being vertically arranged and respectively glued onto the peripheries of the two walls of the soft pocket to form gas passage between adjacent threads;

two gas cathodes glued to the two walls of the soft pocket, respectively, the two gas cathodes being permeable to air but impermeable to liquids to allow gases to enter the metal-gas cell, and the two gas cathodes being electrically connected to each other, whereby the two gas cathodes and the two walls of the soft pocket cooperate to define a liquid retaining soft pocket chamber having a lower portion, an upper portion and a top opening defined between the top edges of the two walls of the soft pocket;

two soft plates with a central opening used to help to seal the two gas cathodes to the two walls of the soft pocket, respectively, the two soft plates being made of a same material as the soft pocket;

a rigid planar first retaining structure and a rigid planar second retaining structure attached to the peripheries of the two walls of the soft pocket, respectively, the second retaining structure being moveable with respect to the first retaining structure between a first retaining structure position, wherein the first retaining structure is proximal to the second

retaining structure to close tightly the top opening of the soft pocket chamber, and a second retaining structure position, wherein the first retaining structure is spaced apart from the second retaining structure to open the top opening of the soft pocket chamber;

a metal anode disposed within the soft pocket chamber;

two sheets of separator permanently and respectively installed between each pair of the gas cathode and the group of threads, respectively; and

a sub-assembly, located in an upper-most position of the metal-gas cell, being permeable to air but impermeable to liquids in order to reduce a pressure difference between the soft pocket chamber and an outside atmosphere.

2. The metal-gas battery of claim 1, wherein the metal-gas cell further comprises an electrolyte disposed within the soft pocket chamber.

3. The metal-gas battery of claim 2, wherein the electrolyte is saturated with zinc oxide at a concentration of about 20 – 50 g/L.

4. The metal-gas battery of claim 2, wherein the electrolyte is saturated with zinc oxide at a concentration of about 35 – 40 g/L.

5. The metal-gas battery of claim 2, wherein the electrolyte is an aqueous solution containing a compound chosen from a group consisting of potassium hydroxide, sodium hydroxide and sodium chloride.

6. The metal-gas battery of claim 2, wherein the electrolyte is an aqueous solution containing potassium hydroxide.

7. The metal-gas battery of claim 1, wherein the two groups of threads are made of a plastic and alkaline-resistant material.

8. The metal-gas battery of claim 1, wherein the two groups of threads are made of polypropylene or nylon.

9. The metal-gas battery of claim 1, wherein a semi-permeable membrane is disposed in the sub-assembly to allow gases to flow out from the upper portion of the soft pocket through the sub-assembly, the semi-permeable membrane being permeable to gases but being impermeable to liquids.

10. The metal-gas battery of claim 9, wherein the semi-permeable membrane is made of PTFE.

11. The metal-gas battery of claim 1, wherein all edges of the metal anode are rounded to avoid dropping metal powder.

12. The metal-gas battery of claim 1, wherein the metal anode comprises an electrically conductive support structure with a metal anode

material attached thereto, and the support structure has a lower portion and an upper portion.

13. The metal-gas battery of claim 12, further comprising a plurality of internal metal-gas cells sandwiched between a first outermost metal-gas cell and a second outermost metal-gas cell, the upper portion of the metal anode in each of the internal metal-gas cells being electrically connected to gas cathodes of an adjoining metal-gas cell by an anode conductor.

14. The metal-gas battery of claim 1, wherein the metal anode is hung firmly within the soft pocket by a hook when the first and the second retaining structures are in the first retaining structure position.

15. The metal-gas battery of claim 14, wherein the hook is attached to the first retaining structure.

16. The metal-gas battery of claim 1, wherein the soft pocket is made of thermoplastic rubber or thermoplastic elastomer.

17. The metal-gas battery of claim 1, wherein the soft pocket is made of polypropylene, neoprene, ethylene propylene diene monomer, butyl rubber, ethylene propylene copolymer, or chlorosulfonated polyethylene.

18. The metal-gas battery of claim 1, wherein the soft pocket is made of polypropylene or ethylene propylene diene monomer.

19. The metal-gas battery of claim 1 further comprising eight elbow tubes respectively located at four corners of the two separators, one end of each elbow tube is located in the gap between each pair of the separator and the gas cathode, and the other end of each elbow tube passes through a hole on each separator and a hole on each wall of the soft pocket.

20. The metal-gas battery of claim 1 comprising a plurality of metal-gas cells.

21. The metal-gas battery of claim 20, wherein the metal-gas cells are electrically connected in series.

22. The metal-gas battery of claim 1, wherein the two gas cathodes are electrically connected by at least a pair of metal contacts extended upward above the top opening of the soft pocket.

23. A zinc-air battery comprising:

(a) a plurality of internal zinc-air cells sandwiched between a first outermost zinc-air cell and a second outermost zinc-air cell, each zinc-air cell comprising:

a soft pocket having two flexible and planar walls, wherein peripheries of the two walls are connected except along respective top edges of the two walls, the soft pocket being made of an elastic and alkaline-resistant material;

two groups of threads being vertically arranged and respectively glued onto the peripheries of the two walls of the soft pocket to form air passage between adjacent threads;

two air cathodes glued to the two walls of the soft pocket, respectively, the two air cathodes being permeable to air but impermeable to liquids to allow air to enter the zinc-air cell, and the two air cathodes being electrically connected to each other, whereby the two air cathodes and the two walls of the soft pocket cooperate to define a liquid retaining soft pocket chamber having a lower portion, an upper portion and a top opening defined between the top edges of the two walls of the soft pocket;

two soft plates with a central opening used to help to seal the two air cathodes to the two walls of the soft pocket, respectively, the two soft plates being made of a same material as the soft pocket;

a rigid planar first retaining structure and a rigid planar second retaining structure attached to the peripheries of the two walls of the soft pocket, respectively, the second retaining structure being moveable with respect to the first retaining structure between a first retaining structure position, wherein the first retaining structure is proximal to the second retaining structure to close tightly the top opening of the soft pocket chamber, and a second retaining structure position, wherein the first retaining structure is spaced apart from the second retaining structure to open the top opening of the soft pocket chamber;

a zinc anode disposed within the soft pocket chamber;

two soft plates with a central opening used to help to seal the two air cathodes to the two walls of the soft pocket, respectively, the two soft plates being made of a same material as the soft pocket; and

a sub-assembly, located at the upper-most position of the zinc-air cell, being permeable to air but impermeable to liquids in order to reduce a pressure difference between the soft pocket chamber and an outside atmosphere;

(b) a positive battery terminal electrically connected to the two air cathodes of the first outermost zinc-air cell; and

(c) a negative battery terminal electrically connected to the zinc anode of the second outermost zinc-air cell;

wherein an upper portion of the zinc anode in each internal zinc-air cell is electrically connected to air cathodes of an adjoining zinc-air cell by an anode conductor.

24. The zinc-air battery of claim 23, wherein each zinc-air cell further comprises an electrolyte disposed within the soft pocket chamber.

25. The zinc-air battery of claim 24, wherein the electrolyte is saturated with zinc oxide at a concentration of about 20 – 50 g/L.

26. The zinc-air battery of claim 24, wherein the electrolyte is saturated with zinc oxide at a concentration of about 35 – 40 g/L.

27. The zinc-air battery of claim 24, wherein the electrolyte is an aqueous solution containing a compound chosen from a group consisting of potassium hydroxide, sodium hydroxide and sodium chloride.

28. The zinc-air battery of claim 24, wherein the electrolyte is an aqueous solution containing potassium hydroxide.

29. The zinc-air battery of claim 23, wherein the two groups of threads are made of a plastic and alkaline-resistant material.

30. The zinc-air battery of claim 23, wherein the two groups of threads are made of polypropylene or nylon.

31. The zinc-air battery of claim 23, wherein a semi-permeable membrane is disposed in the sub-assembly to allow air to flow out from the upper portion of the soft pocket through the sub-assembly, the semi-permeable membrane being permeable to air but being impermeable to liquids.

32. The zinc-air battery of claim 24, wherein the semi-permeable membrane is made of PTFE.

33. The zinc-air battery of claim 23, wherein all edges of the zinc anode are rounded to avoid dropping zinc powder.

34. The zinc-air battery of claim 23, wherein the zinc anode comprises an electrically conductive support structure with zinc powder attached thereto, and the support structure has a lower portion and an upper portion.

35. The zinc-air battery of claim 23, wherein the zinc anode is hung firmly within the soft pocket by a hook when the first and the second retaining structures are in the first retaining structure position.

36. The zinc-air battery of claim 35, wherein the hook is attached to the first retaining structure.

37. The zinc-air battery of claim 23, wherein the soft pocket is made of thermoplastic rubber or thermoplastic elastomer.

38. The zinc-air battery of claim 23, wherein the soft pocket is made of polypropylene, neoprene, ethylene propylene diene monomer, butyl rubber, ethylene propylene copolymer, or chlorosulfonated polyethylene.

39. The zinc-air battery of claim 23, wherein the soft pocket is made of polypropylene or ethylene propylene diene monomer.

40. The zinc-air battery of claim 23 further comprising eight elbow tubes respectively located at four corners of the two separators, one end of each elbow tube is located in the gap between each pair of the separator and

the air cathode, and the other end of each elbow tube passes through a hole on each separator and a hole on each wall of the soft pocket.

41. The zinc-air battery of claim 23, wherein the zinc-air cells are electrically connected in series.

42. The zinc-air battery of claim 23, wherein the two air cathodes are electrically connected by at least a pair of metal contacts extended upward above the top opening of the soft pocket.